Attachment II

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Events

February 16, 2020
Flaring Due to Insufficient Recycle Hydrogen

Refinery Flare Event – Cause Investigation Report

1. Date on which the report was drafted: April 29, 2020

2. The refinery name and site number:
Refinery: Chevron Richmond Refinery
Refinery Site Number: A0010

3. The assigned refinery contact name and phone number:
Contact Name: Katie Gong
Contact Phone Number: (510) 242-1930

Is this a rescission/modification of a previous report: No.

Date of initial report: N/A

Reason for rescission/modification: N/A

4**. Identification of flare (s) at which the reportable event occurred by reviewing water seal monitoring data to determine which seals were breached during the event**

Flare	**Reportable Event (SO2 or Vent Gas Volume)**
NISO (S-6013)	SO2
SISO (S-6012)	SO2
FCC (S-6016)	SO2

5. The flaring event duration for each affected flare

Flare (Source Number): NISO (S-6013)
The Date(s) of the event: February 16, 2020
The start time of the event: 12:29AM
The end time of the event: 12:48AM
The net duration of event (in hours and minutes): 14 minutes

Flare (Source Number): SISO (S-6012)
The Date(s) of the event: February 16, 2020
The start time of the event: 12:30AM
The end time of the event: 12:50AM
The net duration of event (in hours and minutes): 17 minutes

Flare (Source Number): FCC (S-6016)
The Date(s) of the event: February 16, 2020
The start time of the event: 12:30AM
The end time of the event: 12:50AM
The net duration of event (in hours and minutes): 18 minutes

6. A brief description of the flaring event –

On February 16, 2020, a reactor experienced a temperature excursion in the Taylor Katalytic Denitrifier (TKN) Unit of the Hydroprocessing Area Business Unit. The hydrogen recycle gas controller for the reactor was operating in manual control. Operations attempted to control the temperature excursion by making process moves, but there was insufficient hydrogen recycle gas flow during the response. After troubleshooting, the reactor was depressurized to relief to control the temperature excursion, and flaring began at approximately 12:29 AM at the North Isomax (NISO), South Isomax (SISO), and Fluid Catalytic Cracking (FCC) flares. The primary source of vent gas flared during this event was process material from the TKN Unit. Operations immediately began to troubleshoot and made process moves to control the temperature excursion, and flaring stopped at approximately 12:39 AM.

At approximately 12:42 AM, the Automatic Depressurization System (ADS) timer for the reactor activated due to low hydrogen recycle gas flow, and flow was routed to relief. Flaring began at approximately 12:42 AM at the NISO, SISO, and FCC flares. The primary source of vent gas flared during this event was process material from the TKN Unit. Operations immediately began to troubleshoot and manually blocked in the ADS valve at approximately 12:47 AM. As a result, flaring ceased at approximately 12:50 AM.

The sulfur dioxide (SO2) emissions from the NISO, SISO, and FCC flares exceeded 500 pounds (lbs) on February 16, 2020.

7. A process flow diagram showing the equipment and process units that were the primary cause of the event.

See Attachment IIa

8. The total volume of vent gas flared (MMSCF) throughout the event

Flare	Volume (MMSCF)
NISO	0.25
SISO	0.19
FCC	0.16

9. The emissions associated with the flaring event per calendar day

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO2 (lbs.)
NISO	February 16, 2020	49.9	202.5	1285.5
SISO	February 16, 2020	31.0	186.0	586.4
FCC	February 16, 2020	18.6	188.0	713.4

Assumptions used to calculate emissions – consistent with the reporting under Reg. 12-11.

10. A statement as to whether or not the gas was scrubbed to eliminate or reduce any entrained compounds and a list of the compounds for which the scrubbing was performed.

The vent gas was not scrubbed to eliminate or reduce any entrained compounds.

11. The primary cause of the flaring event including a detailed description of the cause and all contributing factors. Also identify the upstream process units that contributed vent Gas flow to the flare header and provide other flow instrumentation data where available.

1. Root cause: Operations was unaware the ADS timer was active for low hydrogen recycle gas flow.

   Contributing factor: There was a lack of awareness of the low hydrogen recycle gas ADS function.

2. Root cause: The hydrogen recycle gas flow was operating in manual control at the time of the event.

   Contribution factor: The hydrogen recycle gas flow controller had been operating abnormally, and the higher priority repair work request was delayed due to rescheduling.

The main contributor of vent gas flow during this event originated from the TKN unit.

12. Describe all immediate corrective actions to stabilize the flaring event, and to reduce or eliminate emissions (flare gas recovered or stored to minimize flaring during the event). If a decision was made not to store or recover flare gas, explain why.

Operations immediately began to troubleshoot and made process moves to control the temperature excursion.

Operations immediately began to troubleshoot and manually blocked in the ADS valve.

13. Was the flaring the results of an emergency? If so, was the flaring necessary to prevent an accident, hazard or release to the atmosphere?

The flaring was not due to an Emergency (defined in Regulation 12-12-201) as interpreted by the BAAQMD.

14. If not the result of an emergency and necessary to prevent an accident, hazard or release to the atmosphere, was the flaring consistent with an approved FMP? If yes, provide a citation to the facility's FMP and any explanation necessary to understand the basis for this determination.

The flaring was consistent with Chevron's FMP Section 5.1 Figure 5-1. This event was unplanned. Causes for the flaring were analyzed through a TapRoot® investigation and the corrective actions have already been or will be implemented to reduce the likelihood of a recurrence of flaring resulting from the same causes.

15. If the flaring was due to a regulatory mandate to vent to flare, why couldn't the gas be recovered, treated, and used as fuel gas?

N/A. Flaring was not due to regulatory mandate.

16. Identify and describe in detail each prevention measure (PM) considered to minimize flaring from the type of reportable flaring event that occurred.
a) State whether the PM is feasible (and will be implemented), or not feasible
b) Explain why the PM is not feasible, if applicable

All prevention measures have been considered and have or will be implemented.

1. Provide refresher training to Operations crews on the reactor ADS timer function and the activation on low hydrogen recycle gas flow.
   Projected completion date: 12/31/2020
2. Provide refresher training to Maintenance schedulers on diligent management of higher priority work requests.
   Projected completion date: 7/31/2020

Flaring Due to Insufficient Recycle Hydrogen

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